Bahamas off-grid energy storage

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The Bahamas is a country of over 700 islands,but only 30 are inhabited. Together with Turks and Caicos islands, the Bahamas form part of the Lucayan Archipelago. islands. The archipelago stretches for more than 1,000 kms (longer than the British Isles) but has a population of less than 500,000. The islands enjoy an average of 350 sunny days per year, making them an ideal location for solar energy installations.

An islands wide grid system operated by Bahamas Power and Light (BPL) is available on New Providence(Nassau) using a gas turbine engine while 23 islands have diesel generators with mini grids covering each island. 60% of power is generated from oil based generators. The Bahamas imports $400 million of fossil fuels per year which accounts for almost 20% of the country"s income from tourism, the principal source of wealth in the country.

Other inhabited islands operate their own diesel engines and must purchase their own fuel and buy and maintain their own generators. The island of New Providence has a gas turbine engine with gas purchased from Texas.

Stability of the grid is the key issue given the widespread distribution of islands and their small permanent populations in the off season. Demand in Nassau can vary between 250 mW and 170 mW capacity through the year. After Covid approximately 1 million tourists visited the Bahamas on an overnight stay in 2021, triple the population of the country.

To maintain a reliable electric grid over a distance of 1,200 kms for less than 500,000 people is extremely difficult and costly. The grid system is distributed through overhead cables similar to the system in the US. This makes the grid very vulnerable to hurricanes and tropical storms. All solar systems and mini grids should use underground cables to distribute power on site. Extreme weather conditions including tropical storms, means maintaining an undersea cable adds substantial extra costs.

BPL has 100,000 customers including large resorts and resort hotels with varying power needs depending on the tourist season. Power requirements are recovering post covid but stability remains an issue.

Solar energy and its adoption in the Bahamas has the support of the Bahamian government. A self-sustaining solar project including battery storage on Ragged Island catering for all its 100 inhabitants was established for a total cost of $3 million. The government would like to add underground cabling for the mini grid so as to make energy provision hurricane proof.

In the longer term "The Family Islands Solarization Program is a program launched by the Bahamas Power & Light (BPL), with support from the Rocky Mountain Institute (RMI) and Carbon War Room"s Islands Energy Program. The program aims to develop solar energy projects on four islands: Andros, Bimini, Eleuthera and

Inagua?. The islands were chosen due to projected increases in energy demand?. The development of the four solar-fueled power systems will set the stage to scale the Family Islands solar program across the island chain"s outlying islands, as well as contribute to the Bahamas achieving a national goal of renewable energy resources meeting 30% of electricity needs by 2030?.

Its an ambitious programme and so many private and commercial energy users will prefer to install their own systems.

As with other energy sources Solar power can be used for all applications but with less issues about cost and convenience.

Includes all domestic uses such as air conditioners and fridges but also water supply, swimming pool and irrigation pumps. Offgrid solar will have other benefits including power for irrigation pumps to grow own crops several times a year.

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